

REMARKS

Favorable reconsideration of this application is respectfully requested.

Claims 1-34 are pending in this application. Claims 16 and 20 were objected to for informalities. Claims 1-4, 7-8, 10, 12-14, 16, 19, 21, 22, 25-28, 31, and 32 were rejected under 35 U.S.C. § 102(b) as anticipated by JP 2000-171924 to Kawaguchi. Claims 5, 6, 15, 20, 23, 24, 29, 30, 33, and 34 were rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. patent 5,175,601 to Fitts in view of Kawaguchi. Claims 9 and 11 were rejected under 35 U.S.C. § 103(a) as unpatentable over Kawaguchi in view of U.S. patent 6,700,669 to Geng and U.S. patent 6,522,787 to Kumar et al. (herein "Kumar"). Claims 17 and 18 were rejected under 35 U.S.C. § 103(a) as unpatentable over Kawaguchi in view of U.S. patent 6,038,074 to Kitaguchi et al. (herein "Kitaguchi").

Addressing first the objection to claims 16 and 20, those claims are amended by the present response to clarify the language therein and to address the objection therein, along the lines suggested in the Office Action.

Addressing now the prior art rejections, those rejections are traversed by the present response.

Initially, applicants note the claims are amended to clarify features recited therein. Specifically, independent claim 1 now further recites "a rotation component detecting part detecting, based on a gravity direction and an angle around the gravity detected by a sensor, a rotation component of position information specifying a position to take a picture of the object by the picture taking part". Claim 1 is also further amended to clarify the operation of the three-dimensional shape composing part, clarifying how that element calculates a translation component of the position information utilizing the rotation component and expresses points of an object by a coordinate in a single coordinate system to produce a composed three-dimensional image. The other independent claims are amended to recite

similar features. That claimed subject matter is fully supported by the original specification, for example by the attitude detecting part 16 shown in Figure 1 in the present specification and the corresponding description thereto.

The claims as amended clarify how a three-dimensional shape of an object can be measured. The claims more specifically clarify utilizing a rotation component of position information taken by a picture taking part, based on a gravity direction and an angle around the gravity.

With reference to Figures 7A-7D in the present specification as a non-limiting example, the claims are directed to a shape measurement system for measuring a three-dimensional shape of an object. According to the claimed invention, pictures of an object are taken at at least first and second positions. In Figure 7A the first position may be position DB and the second position may be position DC. Taking a picture from position DB in Figure 7A results in generating points as shown in Figure 7B, and taking a picture from position DC in Figure 7A results in generating points as shown in Figure 7C. As shown for example in those Figures, the second position DC takes a picture of the object that includes different portions than as taken at the first point DB. That is, as shown for example in Figures 7B and 7C the points generated by taking the second picture from position DC contains additional points than generated when taking a picture from position DB, although there may be overlapping with the points taken of the picture from position DB.

As noted above, the claims clarify that achieving measuring a three-dimensional shape of an object as shown for example in Figure 7A-7D in the present specification further utilizing rotation components of the position information specifying a position to take a picture of the object by the picture taking part. That is, the claims further clarify that a rotation component at the picture taking positions DB and DC is also considered in measuring the shape of the three-dimensional object.

The features recited in the claims are believed to clearly distinguish over the applied art.

Each of the outstanding rejections cites Kawaguchi as the primary reference, and specifically relies on Kawaguchi to disclose detecting a position at which a picture taking takes a picture, calculating a three-dimensional coordinate of each point of the object, and producing a composed image by a three-dimensional shape composing part. However, applicants respectfully submit Kawaguchi differs from the claims in that Kawaguchi does not at all consider or utilize a rotation component.

As noted above the claims further clarify utilizing “a rotation component of position information specifying a position to take a picture of the object by the picture taking part”, the rotation component being based on a gravity direction and an angle around the gravity detected by a sensor. Kawaguchi does not have any similar operation of utilizing such a rotation component.

Kawaguchi discloses a three-dimensions displacement gauge 26 that can compute an amount of relative displacements of the Moire camera 20. However, Kawaguchi appears to disclose utilizing that three-dimensions displacement gauge 26 to automatically calculate an optimal timing for shutter actuation, see for example paragraphs [0018] and [0023] in Kawaguchi. Kawaguchi does not, however, disclose or suggest detecting a rotation component of position information specifying a position to take a picture of the object by the picture taking part. Moreover, Kawaguchi does disclose or suggest utilizing such a rotation component to calculate a translation component of position information based on such a rotation component.

Stated another way, Kawaguchi does not disclose or suggest utilizing a rotation component as in the claimed invention.

Thereby, the claims as written are believed to clearly distinguish over Kawaguchi.


Moreover, no teachings in any of the further cited references to Fitts, Geng, Kumar, or Kitaguchi are believed to cure the above-noted deficiencies of Kawaguchi.

In view of the present response applicants respectfully submit the claims as written distinguish over the applied art.

As no other issues are pending in this application, it is respectfully submitted that the present application is now in condition for allowance, and it is hereby respectfully requested that this case be passed to issue.

Respectfully submitted,

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